

IN CONCLUSION

As always, I have talked too much and said too little. My appraisal of modern medical practice may be criticized on the ground that, since I am not a physician, I know nothing about its problems; but not on the ground of lack of sincerity or sympathy. I have tried to discuss four formidable necessities of modern medicine: first, the need of correlating the scientific and artistic phases of practice; second, the need of developing "medical ethics" in a manner consistent with idealistic ethical theory; third, the need of raising general practice to the dignity of specialism; and fourth, the need of providing a monetary incentive to the effective practice of preventive medicine—preventive medicine as the general practitioner's specialty, practiced on a retainer fee basis. I hope this tough meat which you have been given to chew over will not jeopardize your kind friendship toward me. Your tolerant friendliness means much in comfort and inspiration to me, and I hope that I may reciprocally justify such a feeling in you.

University of California Medical School.

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ACUTE APPENDICITIS*

A CLINICAL REVIEW OF ONE THOUSAND
CONSECUTIVE CASES

By GEORGE K. RHODES, M.D.
WALTER BIRNBAUM, M.D.

AND

MAURICE J. BROWN, M.D.
San Francisco

DISCUSSION by Charles T. Sturgeon, M.D., Los Angeles; H. Glenn Bell, M.D., San Francisco; Edwin M. Taylor, M.D., Oakland.

IT is the purpose of this paper to show the need for early operation in acute appendicitis, and to emphasize the application of certain measures in its treatment. The number of publications concerning appendicitis is increasing (Table 1); the renewed interest in the subject is likewise reflected in the serious discussion, in larger medical centers, of various controversial views. The present discrepancies in the operative mortality rate point toward some basic deficiencies in the present mode of treatment. There yet remain many controversial questions pertaining to surgical intervention, among which some of the most important are the time of operation, the necessity for drainage, the type of incision, the kind of anesthesia, etc. In order to justify our present methods of

* From the Department of Surgery, University of California Medical School, and the Department of Public Health, San Francisco Hospital, San Francisco.

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TABLE 1.—Literature Concerning Appendectomy and Appendicitis 1914-1935

Year	Number of Articles
1914	33
1925	142
1929	323
1930	292
1931	334
1932	348
1933	392
1934	365
1935	370

procedure, we have analyzed the consecutive cases of one thousand patients surgically proved to have acute appendicitis who underwent immediate operation on the emergency service of the San Francisco Hospital. This series is comprised of patients treated on one service, according to the same policy, over a ten-year period. During this period, the operative mortality in all types of acute appendicitis reported here was 3.6 per cent. In gangrenous appendicitis without perforation, it was 1.9 per cent, and with perforation, somewhat higher (Table 2). These figures compare favorably with those of other American and European clinics¹ (Table 3).

ONE THOUSAND CONSECUTIVE CASES OF ACUTE
APPENDICITIS

Most of the emergency surgery for the indigent is done in the San Francisco Hospital (bed capacity 1,000) and, as has been pointed out by others, the type of appendicitis seen in this stratum of society is usually of the variety most difficult to treat. The patients, of poor physical stock, are more likely to delay in seeking medical attention and to indulge in self-medication and purgation than are other classes.

FOUR GROUPS

We have divided our cases into four major groups, on the basis of pathologic changes proved at operation. These groups, with their respective mortality rates, are:

	Drained Per Cent	Not Drained Per Cent	Total Per Cent
1. Simple acute appendicitis	0.84
2. Gangrenous appendicitis, without perforation	9.0	0.9	1.9
3. Gangrenous appendicitis, with perforation	10	2.4	8.8
4. Appendiceal abscess	5.3

This classification has been chosen because of its simplicity. One great difficulty, in comparing statistics, is the lack of uniformity in classification by various authors, and the inaccurate or incomplete statement of the pathologic changes actually present.

DIAGNOSIS

The preoperative diagnosis was seldom in doubt. The classical history of abdominal pain, followed after a few hours by increasing signs and symptoms of localizing peritonitis, was the usual observation.

A good history and a careful physical examination are most important. In our experience, temperature and blood count seldom are the determining factors in diagnosis, because of their

TABLE 2.—Mortality by Type

Type	Description	Cases	Total Mortality Per Cent	Mortality Per Cent, Excluding Deaths and Not Resulting from Appendicitis
I	Acute, simple	355	0.84	0.65
II	Gangrenous, nonperforated	256	1.9	1.9
III	Gangrenous, perforated	202	8.8	7.4
IV	Appendiceal abscess	187	5.3	4.4
	Total	1,000	3.6	3.0

wide variation in identical appendiceal pathologic states.

Most errors and delays were made in the true pelvic and retrocecal types of appendicitis. In both instances, while the prodromal history, etc., may be suggestive, there is little or no evidence of parietal peritoneal involvement. The pelvic appendix often produces signs and symptoms referable to the bladder and rectum, such as frequent stools and dysuria. Further, in pelvic appendicitis the early signs and symptoms of peritonitis may be those referred to the left lower quadrant. The presence of a tender mass rectally is sufficient to substantiate the diagnosis of pelvic appendicitis in any suspicious case. The most significant sign in retrocecal inflammation is tenderness in the flank, with little or no rigidity of the anterior abdominal wall. Because of the proximity of the right ureter to the inflammatory process, one often finds signs and symptoms suggestive of disease of the right upper urinary tract.

THE TIME TO OPERATE

Perhaps most controversy arises concerning the problem of the time to operate. Agreement is general that, in the early stages of acute appendicitis, operation should be performed immediately. Methods differ, however, for those patients who are seen late—that is, after the third day. From the third to the sixth day of the attack is the most dangerous period. Stanton,² in an analysis of 60,000 cases reported recently, shows that the mortality in that period is from 8 to 12 per cent. During this time, either the process is subsiding or peritonitis is present. As Richardson³ has said, "It is too late for early operation and too early for late operation." Such distinguished surgeons as Murphy,⁴ Fowler,⁵ and Ochsner⁶ in the United States, Sherron⁷ in England, and Fromme⁸ in Germany, have defended expectant treatment in certain of these difficult types of appendicitis. It has been said, no doubt correctly, that it is the unintelligent application, and the abuse of the conservative regimen, which have

done more harm, and that it is the choice of unsuitable cases which has brought this principle into disrepute. Wilkie⁹ said: "Those who say that there is no state in which one should not operate may be skillful technicians, but they are not surgical pathologists." Despite such formidable opinion to the contrary, we feel strongly that appendicitis in any stage of development, except for a small group of cases to be mentioned later, requires immediate surgery. To substantiate or disprove this statement, the following questions must be answered:

1. Can the pathologic changes present be determined accurately enough before operation to warrant delay?
2. Although it is true, that late cases have a high mortality, has it been convincingly shown that the mortality is actually higher with operation than without it?
3. Is the low mortality in this series the result of any factor other than the choice of the time to operate?
4. When is the time to operate?
5. Which patients should not be operated upon?

1. *Can the pathologic changes be determined accurately enough before operation to warrant delay?*

A review of the literature shows a cumbersome number of statistics which seem to support widely diverse conclusions. This may be explained by the lack of uniformity in the classification of types of appendicitis, and the clinical basis upon which the classification is made. From clinical study alone it is almost impossible to determine accurately the stage of the changing pathologic process in acute appendicitis. Not everyone can, as Deaver¹⁰ has said, "put my ear to the abdomen, lay my hands upon it . . ." and arrive at a clear conception of what is occurring beneath the abdominal wall. Kennedy,¹¹ discussing what he derisively terms "the physiologic surgeon," and asks: "What is this quiescent stage of the physiologic surgeon? It can be summed up as a mistake in his assumption as to the extent of peritoneal involvement, so that when the physiologic surgeon puts his patient on the waiting list for the subsidence of the acute symptoms ere he considers the patient surgical, *he is wrong*, not only in his idea of the extent of the pathologic involvement, but he is permitting a very local condition to become a very diffuse one. He is outraging the law which gives success in perforative lesions of the abdominal cavity, namely, the earliest possible

TABLE 3.—Comparison of Results of Treatment of Acute Appendicitis in Large European and American Clinics

	Operative Mortality Per Cent
European clinics	5.5
American authors	5.10

TABLE 4.—*Seventy-five Preoperative Diagnoses*

	Local Pathology Change	Location of Appendix	Question of Rupture	Extent of Peritonitis	Abscess Formation
Per cent correct	33.3	40	58.6	61.5	31.3
Per cent incorrect	58.3	49.3	41.4	34.6	14.6
Not noted	13.3	10.6	0	0	4

operative hour. . . . The physiologic surgeon never gets an opportunity to check up on his mistakes; he never learns the true extent of the pathologic lesion other than from the postmortem room."

In order to ascertain the accuracy of preoperative diagnoses, various members of our staff committed themselves in writing before the patient went to surgery. The results of seventy-five opinions were enlightening, in that in estimating "perforation" or "nonperforation," the percentage of error was 41.4; in estimating the extent of peritonitis (*i. e.*, whether it was local or general) the percentage of error was 33 (Table 4).

The underlying pathologic condition is complicated, and is different in each patient. In many of our patients, rupture occurred within six hours, while in a larger number, perforation had not occurred after seventy-two hours. As subject to criticism as this tabulation may be, it does illustrate the fact that in many cases, at least, no conclusion may be drawn with any degree of certainty as to the underlying pathologic factors. Even if such information were obtainable, it is not possible to know in which direction progress is taking place. As Gile and Bowler¹² said: "In delaying surgical intervention in early peritonitis with a rate of 6.5 per cent, we had no preoperative basis for prophesying whether the transfer would be to abscess formation and a mortality of 3.33 per cent, or to general peritonitis with a rate of 36.4 per cent." This is the crux of the situation. The underlying pathologic change is different in each case of appendicitis. It is this underlying change and not the element of time which determines the outcome. The physical evidence of peritonitis is also a very variable factor depending upon the location of the appendix, the pathologic condition, and the reaction of the patient. We are convinced that even competent observers cannot estimate accurately the pathologic condition preoperatively, and hence it seems illogical that we should pursue a course of expectant treatment on such questionable premises. Furthermore, there was an error of 100 per cent in two of our recent cases, in one of which the condition was an acute Meckel's diverticulitis; in the other, a

volvulus of the cecum with early gangrene. It is obvious that delayed treatment of such patients would have been disastrous.

2. *Although it is true that late cases have a high mortality, has it been convincingly shown that the mortality is higher with operation than without it?*

The answer to this question is not difficult. As stated above, statistics are exceedingly numerous in the literature on appendicitis; they appear to point in opposite directions. Since the same patient cannot, on the one hand, be operated upon in a certain stage of the disease and, on the other, be accorded conservative treatment at the same stage, no approach to a scientific decision may be reached. Furthermore, the criteria by which the classifications were evolved vary so widely that one is never sure of the comparableness of the different series. The issue is confused further by variations in the classifications themselves. Ochsner¹³ has said that he obtained 90 per cent recoveries by the use of his conservative method in a type of case which formerly had the same percentage of deaths. It is to be noted, however, that conservatism was supplemented by meticulous adherence to his fourteen dicta which included the Fowler position, the administration of fluids, use of morphia, starvation, etc. Had these points been followed in connection with operation, the mortality rate might have been different in the earlier series.

3. *Is the low mortality of this series the result of any factor other than the choice of the time to operate?*

Intelligent preoperative and postoperative care bear a direct ratio to mortality. A few hours' delay before operation frequently is recommended in order that the patient's general condition may be improved. As Arnheim and Neuhof¹⁴ stated: "The trip to the hospital may have been long and difficult, the patient may arrive in a highly excited state, the patient may be partially dehydrated. These are some of the factors which often lead us to wait a few hours or longer before proceed-

TABLE 5.—*Operative Mortality in Representative and Comparable Series*

	Cases	Mortality Per Cent
San Francisco Hospital....	1,000	3.6
Boland (Atlanta)	4,270	4.4
Keyes (St. Louis)	771	3.8
Fairchild (Woodland)	541	4.4
Bower (Philadelphia)	5,121	5.9
Reid (Cincinnati)	2,003	8.5

TABLE 6.—*Drainage Comparison With Russian Series (1936)*

	San Francisco Hospital	Leningrad Institute for Quick Aid
Number of cases	1,000	1,944
Per cent of abscesses following drainage	13.2	7.8
Per cent of abscesses without drainage	2.9	3.3
Per cent of mortality following drainage	9.8	17
Per cent of mortality without drainage	1.4	1.5

ing with operation in the second and third day of attack in acute appendicitis."

If early peritonitis is noted at operation, the accepted treatment of peritonitis is begun at once before paralytic ileus develops. The early and continuous use of the Connell suction is a valuable adjunct to postoperative treatment. It creates a negative pressure which prevents gastric dilatation, paralytic and mechanical ileus. If the apparatus functions properly, the need for enterostomy becomes very limited. Fowler's position and hot massive abdominal stupes also aid in the patient's satisfactory convalescence. The intelligent use of pitressin-like compounds has also proved valuable in the treatment of paralytic ileus. The early use of cathartics or enemas after operation has dangerous potentialities, and these measures are never employed by us. Recently we witnessed elsewhere two fatalities which were the direct result of postoperative enemas. In these, the friable cecum was ruptured at the site of the appendectomy.

4. *When is the time to operate?*

For the reasons stated above, it is our conviction that immediate operation is essential. This has long been axiomatic in the treatment of the early cases. We believe that, with few exceptions, this same dictum should obtain in all cases and types of acute appendicitis regardless of the period in which the patients are first seen, and that this policy is sound is evidenced by our mortality rate, which compares very favorably with those reported in the literature (Table 5).

5. *Which patients should not be operated upon?*

Those patients whose condition is such that they are not likely to survive the ordeal of the operation itself are not operated upon immediately. This group includes the patient who is in the latest stages of the disease. It seems likely that many of the papers which advocate expectant treatment refer to this type of peritonitis. If this is so, we are in agreement with them; the most immature surgical judgment would not dictate operation in such cases.

Our own experience places patients with the following signs and symptoms in this group:

(a) Those in poor general physical condition either from coincidental disease, such as a cardiac or pulmonary lesion, or those debilitated from long sepsis or toxic state.

(b) Those with peritonitis that, from physical signs and the general bodily reaction, seem unusually acute and fulminating. In these patients the pulse is rapid and the volume impaired. Often there is other evidence of threatened circulatory failure. This condition is seen frequently in children. This group of patients undoubtedly will do better if operation is deferred until a conservative type of therapy can build up the general or local resistance. The so-called Ochsner type of conservative therapy has its ideal application in these patients. In many so treated, nature will ultimately reduce the surgery indicated to a simple incision and drainage of a localized abscess; usually the abscess points into the cul-de-sac and should be opened through the rectum or vagina.

If our policy of early operation is not increasing our mortality rate, then the pressing demand in some clinics for delayed operation has little justification. It is interesting to note that recently, in a comparable series of cases studied at the Leningrad Institute for Quick Aid in Russia,¹⁵ the same conclusion was reached (Table 6). Further, early operation entails the factor of greater economy in the matter of prolonged hospitalization. The presence of long-standing intra-abdominal pathologic conditions, such as would follow delayed treatment, must lead to a greater number of intra-abdominal complications. The eventual drainage of intra-abdominal abscesses often results in ventral hernia.

TYPES OF INCISIONS

We have favored modifications of the McBurney incision in most instances. The exposure has been adequate and the convalescence shorter and smoother.

A right rectus incision provides very free and adequate exposure, but there is always the danger of disturbing a localized peritonitis and thus contaminating the entire abdominal cavity.

Objections to drainage through a rectus incision are those of sequelae such as evisceration, early and later intestinal obstruction, ventral hernia, etc. Since we have almost ceased to drain, our objections to the rectus incisions are less than formerly.

DRAINAGE IN PERITONITIS

For several years we have avoided all intra-abdominal drainage in peritonitis.¹⁶ Perforated peptic ulcers, traumatic injuries of the gastrointestinal and genito-urinary tracts are closed without drainage. It is only in the chronic, well walled-off abscesses that we still use drains. The patients in this series who had drainage were those, for the most part, in the earlier years of our study before the general use of drains had been discarded. There is abundant clinical and laboratory evidence to show that drainage of the abdominal cavity in peritonitis is impossible and inadvisable for the following reasons:

(a) Within a very few hours the drain ceases to act other than as a foreign body which is walled off by adhesions of omentum, intestines and coagulum.

(b) The presence of a foreign body, such as a drain, has been shown to lower the natural immunity of the peritoneum against infection. (This would indicate that the drain is a menace rather than a help.)

(c) Drainage causes a temporary loss of the normal defensive peritoneal fluid.

(d) There is a longer and more stormy convalescence because of the added intra-abdominal pathologic changes caused by the foreign body, resulting in partial obstruction, ileus, and increased peritonitis.

(e) The incidence of infection in the wound is greater; an intra-abdominal drain through an infected wound attracts and harbors all the dependent suppuration of that abdominal wound. The profuse purulent discharge from such a drained wound arises primarily from suppuration

TABLE 7.—*Drainage*

	Intra-abdominal Complications (Pelvic Abscess; Ileus, Dynamic and Adynamic; Hemorrhage, Subphrenic Abscess, etc.)		Pelvic Abscess Per Cent		Mortality Per Cent	
	Group II Gangrenous Nonperforated	Group III Gangrenous Perforated	Group II	Group III	Group II	Group III
Drained (121 cases)	19 per cent (of 32 cases)	37.7 per cent (of 89 cases)	9.3	15.3	9	10
Not drained (337 cases)	2.7 per cent (of 224 cases)	8.9 per cent (of 113 cases)	0	7.9	0.9	2.4

in the abdominal wall and not from within the abdominal cavity. The depth of such a drainage tract, therefore, collects suppuration from the abdominal wound and hence the intra-abdominal infection surrounding the drain is aggravated.

(f) There is a high incidence of early and late postoperative hernia.

(g) Necrosis from the pressure of the drain has been the cause of many fecal fistulae and fatal hemorrhages. (We have had only one case of fecal fistula in this series of one thousand cases of acute appendicitis, and it occurred in a case in which drainage was employed.)

(h) Drainage has increased the incidence of secondary intra-abdominal abscesses in our series (Table 7).

We wish to emphasize that this discussion regarding drains refers to intra-abdominal drains, and not to those which are placed in the abdominal wall down to the peritoneum. We feel that adequate drainage of a badly contaminated abdominal wound is very necessary.

CONCLUSIONS

1. An apparently increasing mortality rate from peritonitis needs very careful study with a view to the standardization of treatment in acute appendicitis.

2. We believe that immediate surgery, well done, will give the best ultimate results.

3. There is a very small group of patients whose general and local condition may contraindicate immediate surgery. This group is described.

4. The fallacy of delayed treatment is discussed.

5. The arguments against intra-abdominal drainage in peritonitis are stated.

490 Post Street.

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DISCUSSION

CHARLES T. STURGEON, M. D. (1930 Wilshire Boulevard, Los Angeles).—Though we continue to write about acute appendicitis, expressing our views and methods of procedure, the mortality also continues to increase. Many factors are responsible for this increasing mortality:

1. Delay in seeking medical attention.
2. Incorrect diagnosis.
3. "Watchful waiting."
4. Inadequate preoperative preparation of the patient.

I feel that the greatest factor contributing to the mortality of appendicitis is the so-called "watchful waiting." We have all been taught that as soon as the diagnosis of appendicitis has been made, an appendectomy should be performed immediately. Recently many papers have appeared wherein the author states that patients who have had symptoms of appendicitis for two or three days should be placed under observation; and many doctors, especially the younger men, have accepted this procedure as best applicable to the majority of cases of appendicitis.

In my opinion, "watchful waiting" should be applied only to cases with questionable diagnosis, and only after a careful history and examination has been made. The patient should be hospitalized and carefully observed and

TABLE 8.—*Mortality by Age Groups*

Age	Cases	Deaths	Mortality Percentage
0-9	83	5	7.9
10-19	327	5	1.5
20-29	307	5	1.6
30-39	134	7	5.2
40-49	83	6	8.2
50-59	36	4	11.1
60-69	19	4	21.0
70-79	3	0	0
80-plus	2	0	0
Total	1,000	36	3.6

examined every two hours. As soon as the diagnosis is established, an appendectomy should be performed.

We all realize that patients presenting a generalized peritonitis do not come under the above classification. These patients require observation and preoperative preparation, and when a localized abscess is discovered, it should be drained.

We have stressed the point that the laity must be instructed in the fallacy of delay in consulting a physician, and as to the danger of administering cathartics to patients with abdominal pain. We should also reinstruct the medical profession that immediate surgery is still the treatment of appendicitis.

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H. GLENN BELL, M. D. (University of California Hospital, San Francisco).—It is difficult to discuss a paper when one is in complete accord with the ideas expressed by the author. That is my position in regard to this article. For the past seven years I have followed the plan suggested by Doctor Rhodes and his co-authors, and the results have been very satisfactory.

In one of the tables of Doctor Rhodes' paper he has noted the operative mortality in representative and comparative series from different places. I am familiar with one of the large series cited, and know that in that series, even when treatment has not been delayed, drainage is used much more often than is our custom. Whether that is the entire reason for their higher mortality, it is rather difficult to say. It is reasonable to believe, however, that such drainage plays a tremendous part.

Discussion of isolated cases prove nothing. Only by a careful analysis of a thousand or more cases, such as Doctor Rhodes has made, can one hope to draw conclusions which will help the average surgeon in the more intelligent care of his patients.

In general, the mortality of acute appendicitis in this country is still too high. I am convinced that one reason for this is the feeling that acute appendicitis is a simple disease and that operation for it is simple to perform. Yet we know that appendectomy for acute appendicitis may be a most difficult operation and may tax the surgical skill and judgment of the best surgeon in the country.

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EDWIN M. TAYLOR, M. D. (230 Grand Avenue, Oakland).—It is a pleasure to have an opportunity to discuss some of the controversial points of Doctor Rhodes' paper on "Acute Appendicitis," namely:

When Is the Correct Time to Operate on "Late Cases."—This cannot be set from the beginning of the attack, as some authors attempt to do, but from the physical finding. It seems to me that the very desperately ill, toxic patient, with rapidly diffusing or already diffused peritonitis, has a better chance of recovery if operation is delayed and the so-called Oscher treatment is instituted. The other type of case in which I feel operation should be delayed, is the one with early beginning abscess formation, where there still remains some generalized peritonitis. In the latter type of case, usually in a week or ten days the localized abscess can be drained, and often the appendix removed, if readily accessible, with comparative safety.

Regarding Drains.—The profession in general are using less drains, but I cannot feel quite safe in closing up an abdomen in which the appendix has perforated. I cannot feel that a soft rubber drain is such a hazard in the abdomen. Maybe drains do not actually drain for many hours, but when placed in dependent points, as in the pelvis, in the right lateral gutter or beneath the terminal ileum, are there not sinus tracts formed, through which drainage would take place, should pus accumulate in these areas?

Type of Incision.—This is of paramount importance in treating acute appendicitis with or without peritonitis. The McBurney, or some modification of the lateral incision is certainly the incision of choice when the diagnosis of appendicitis is at all certain. Some large clinics have greatly decreased their mortality by almost universally adopting this type of incision without any change in their use of drains or methods of handling the cases.

Doctor Rhodes' results show a 3.6 per cent operative mortality, certainly lower than any reported from similar clinics.

THROMBOSIS AND EMBOLISM: PREOPERATIVE AND POSTOPERATIVE CARE IN THEIR PREVENTION *

By JOHN H. BREYER, M.D.
Pasadena

Discussion by E. Vincent Askey, M.D., Los Angeles; Willard J. Stone, M.D., Pasadena; H. Brodie Stephens, M.D., San Francisco.

MASSIVE pulmonary embolism has produced tragic and sudden deaths in the practice of every experienced surgeon. It is a postoperative disaster which every surgeon fears. Concerning fatal pulmonary embolism, statistics seem to show that it accounts for about 6 per cent of surgical deaths. One series, by Wharton and Pierson, reported that nearly half of the deaths after gynecologic operations were due to pulmonary embolism. Postoperative thrombophlebitis, which happens more frequently, prolongs hospitalization and often incapacitates the patient for months. Femoral thrombophlebitis, as reported by Albanus, occurred sixty-three times after 1,140 laparotomies, and forty-four of these cases resulted in embolism, of which ten patients died. A critical review of the literature is hereby attempted, hoping to develop some practical plan of prevention which might lessen the incidence.

FREQUENCY

Thrombosis and embolism are complications which occur in many diseases and conditions other than surgical and are, therefore, of general medical interest. They occur in the infectious diseases, as in influenza, pneumonia, tuberculosis, typhoid fever, and in sepsis. They occur in diseases in which the blood itself is altered, as in the anemias, leukemias, and in polycythemia; in cancer and in the degenerative diseases of the vascular system. American, as well as European literature, seems to indicate that the incidence of thrombosis and embolism has increased since the period of the World War. A report from the department of pathology of the University of Toronto, published in 1933, states that they have demonstrated pulmonary emboli in about 10 per cent of routine autopsies upon adults. They found it more common in medical than in surgical cases. In 6,581 necropsies performed in the city hospital at Kiel, Germany, reported in 1934, thrombosis was encountered in 14 per cent, and pulmonary embolism was observed in 9.7 per cent of the autopsies. From 1919 to 1928 the incidence of thrombosis cases had increased eight and one-half times the average for the years prior to 1919. Thrombosis occurred about equally in the two sexes, and was more frequent after forty-five years of age.

RELATION TO SURGICAL TRAUMA

As surgeons we are concerned whether trauma incident to the operation may be an activating factor in the production of thrombosis and embolism. Thrombosis is primarily a physiologic

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